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Some new parnassiine butterflies (Lepidoptera, Papilionidae) from Nepal in the Haruta collection

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Abstract We examined the specimens of the genus *Parnassius*, Papilionidae, collected by the late Mr Toshiro Haruta in Nepal, and found some new or little known taxa. They are: *P. stoliczkanus* Felder & Felder from Mahakali, the westernmost region of Nepal, *P. simo* Gray and *P. acdestis* Grum-Grshimailo from Khumbu, north-east Nepal, and *P. simo* Gray from Mechi, the easternmost region of Nepal. In this paper, we describe three new subspecies as follows: *P. stoliczkanus harutai*, *P. simo kanoi* and *P. simo kangchenus*. We also found that *P. stoliczkanus nobuko* Ohya should belong to *P. stenosemus* Honrath both in the wing markings and male genitalia, confirming the treatment made by Inomata (1998). Also, a single female specimen of *P. acdestis horikatsuhikoi* Shinkai from Khumbu is recorded and discussed in terms of geographical variation.

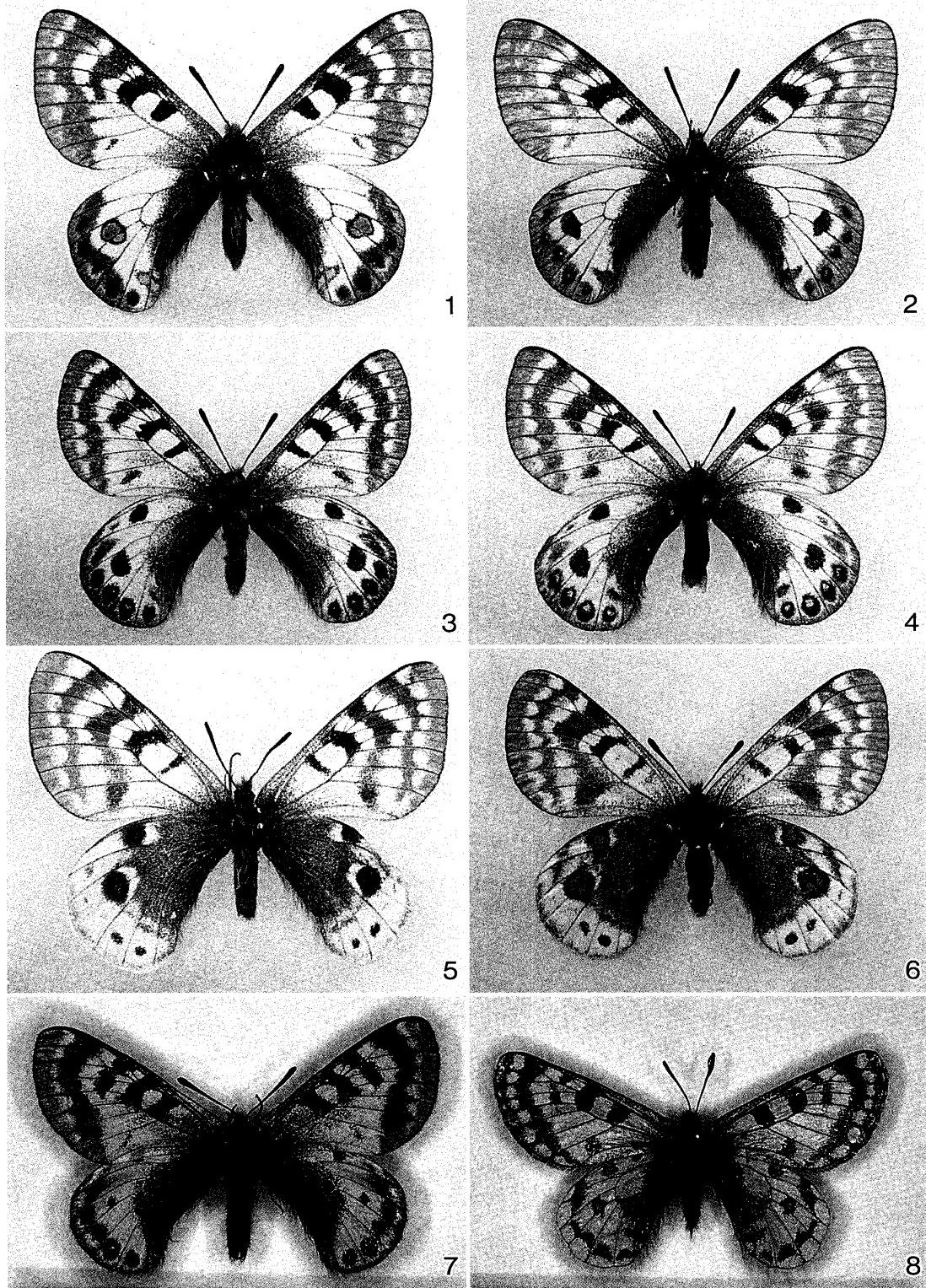
Key words Papilionidae, *Parnassius*, new subspecies, Nepal, taxonomy.

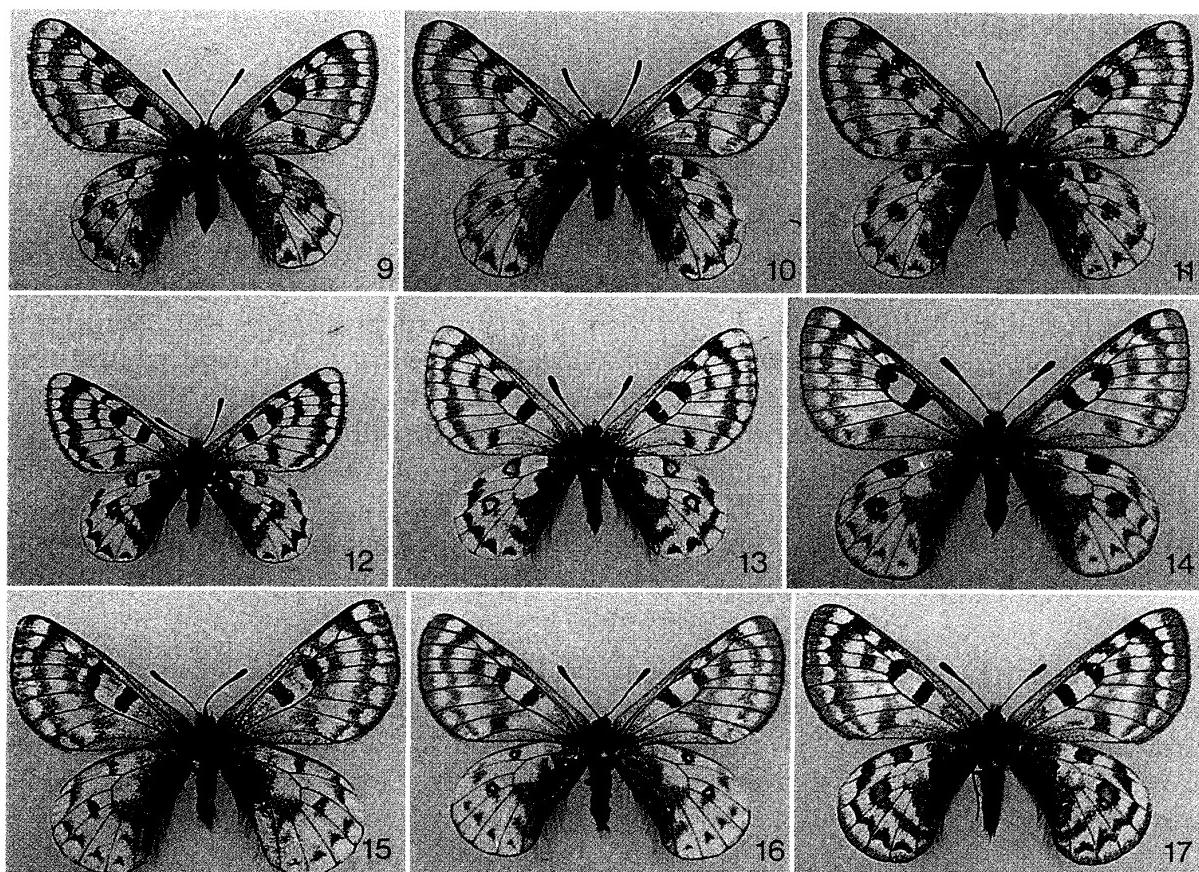
Introduction

Toshiro Haruta (1922–1996) was a remarkable person who devoted much of his later life to the collection of Lepidoptera of Nepal. Particularly invaluable is his moth collection recorded in a series of the supplement of the journal of the Japan Heterocerists' Society: "Tinea" (See, Haruta, T. (Ed.), 1998). Through his alpinist Japanese friends and Nepalese collectors he also obtained a large number of butterflies, which are still not fully examined. Recently, Morishita and Inomata (1998) and Inomata (1998) listed some of them with colour photographs without description of new taxa.

It was more than twenty years ago, in the middle of 1970's, when Mr Haruta visited one of us (K. O.) in Tokyo. He brought for examination a few parnassiine butterflies collected by Katsuhiko Kano, a cultural anthropologist studying Sherpas who live at high altitude in the Khumbu region near Mt Everest, north-east Nepal. The specimens were three males of *P. simo* Gray and a female of *P. acdestis* Grum-Grshimailo, which to K. O.'s knowledge were new to Nepal, and should have to be described as new subspecies. At that time, however, very few specimens to be compared were available, and the full study had to be postponed. The sudden death of Mr Haruta in September 1996, however, caused K. O. a deep sense of regret for not having studied these specimens earlier, and this prompted us to write this report.

Since the later 1980's, Mr Haruta's butterfly collection grew rapidly due to his effort to train Nepalese collectors. Studies on them have thus far been partly carried out on Pieridae, Satyridae, Nymphalidae, Lycaenidae and Hesperiidae (Morishita and Inomata, 1998) and on *Parnassius* (Inomata, 1998). In 1995, Mr Haruta sent one of the Nepalese collectors he trained, Mr M. S. Limbu of Kathmandu, to the Mahakali Valley region in the westernmost part of Nepal up north to Tata (4,490 m) near the border of Tibet. In 1996, Mr Limbu carried out another collecting trip to the Mt Kangchenjunga area in Mechi District, the easternmost part of Nepal. Both trips were exceedingly successful and a large number of





Figs 1-6. *Parnassius* spp. from Nepal. 1. *P. stoliczkanus harutai* ssp. nov., holotype, ♂. 2. *Ditto*, paratype, ♀. 3. *P. stenosemus nobuko* Ohya, paratype, ♂. 4. *Ditto*, paratype, ♀. 5. *P. acdestis horikatsuhikoi* Shinkai, ♀, Gokyo 5,000–5,300 m, Khumbu, north-east Nepal, leg. Katsuhiko Kano, June 6, 1973. 6. *Ditto*, paratype, ♀.

Figs 7-8. Type specimens of *Parnassius* spp. in The Natural History Museum. Courtesy of Dr P. R. Ackery. 7. *P. stoliczkanus kumaonensis* Riley, holotype, ♂, Sillung 12,500 ft, North Kumaon, July 7, 1924. 8. *P. simo acconus* Fruhstorfer (= *moelleri* Bingham), syntype, ♂, Sikkim, 16,000–19,300 ft, July.

Figs 9-17. *Parnassius simo* spp. from Nepal and Tibet. 9. *P. s. kanoi* ssp. nov., holotype, ♂, Gokyo 5,000–5,300 m, Khumbu, north-eastern Nepal. 10. *Ditto*, paratype, ♂. 11. *Ditto*, paratype, ♂. 12. *P. s. hingstoni* Bryk, ♂, Thakare 5,300 m, near Rumbuk, north of Mt Everest, southern Tibet. 13. *P. s. shishapangmanus* Kawasaki, holotype, ♂, Mt Shishapangma 5,200–5,400 m, southern Tibet. 14. *P. s. simo* Gray, ♂, Tata 4,490 m, Mahakali, western Nepal. 15. *P. s. kangchenus* ssp. nov., holotype, ♂, Lhonak 4,550 m, west of Mt Kangchenjunga, eastern Nepal. 16. *Ditto*, paratype, ♀. 17. *P. s. prominentus* Kawasaki, paratype, ♂, Monda-La 5,300 m, southern Tibet.

butterflies were obtained. We were able to examine the parnassiine butterflies collected in these two trips in detail and reach some interesting conclusions, which are also discussed in this paper

Descriptions and discussions

Parnassius stoliczkanus harutai subsp. nov. (Figs 1–2)

Parnassius stoliczkanus ssp. : Inomata, 1998, *Tinea* 15 (Suppl. 1) : 312, pl. 160, figs 4–6.

Size : Considerably larger (average male forewing length 26 mm) than the nominotypical subspecies occurring in Rupshu, north-western Great Himalayas, and slightly larger than ssp. *kumaonensis* Riley* and ssp. *florenciae* Tytler distributed in the northern Kumaon region, India, adjacent to western Nepal. Forewing : Similar to ssp. *kumaonensis*, but clearly distinguishable from it as follows. (1) Black spot in median cell is undeveloped and definitely smaller. (2) Ground colour is pure white, fringes are white. (3) Black submarginal band is strongly developed and tends to be combined with marginal band at spaces 1 and 2. Hindwing : (1) Red spot in space 5 is smaller than in ssp. *spitiensis* Bang-Haas, but much more developed than in ssp. *kumaonensis* and ssp. *florenciae*. On the other hand, the spot in space 7 disappears. (2) Black marginal band is broad and well developed, involving the submarginal black spots with blue scales. (3) Red spot in the anal region is usually well developed.

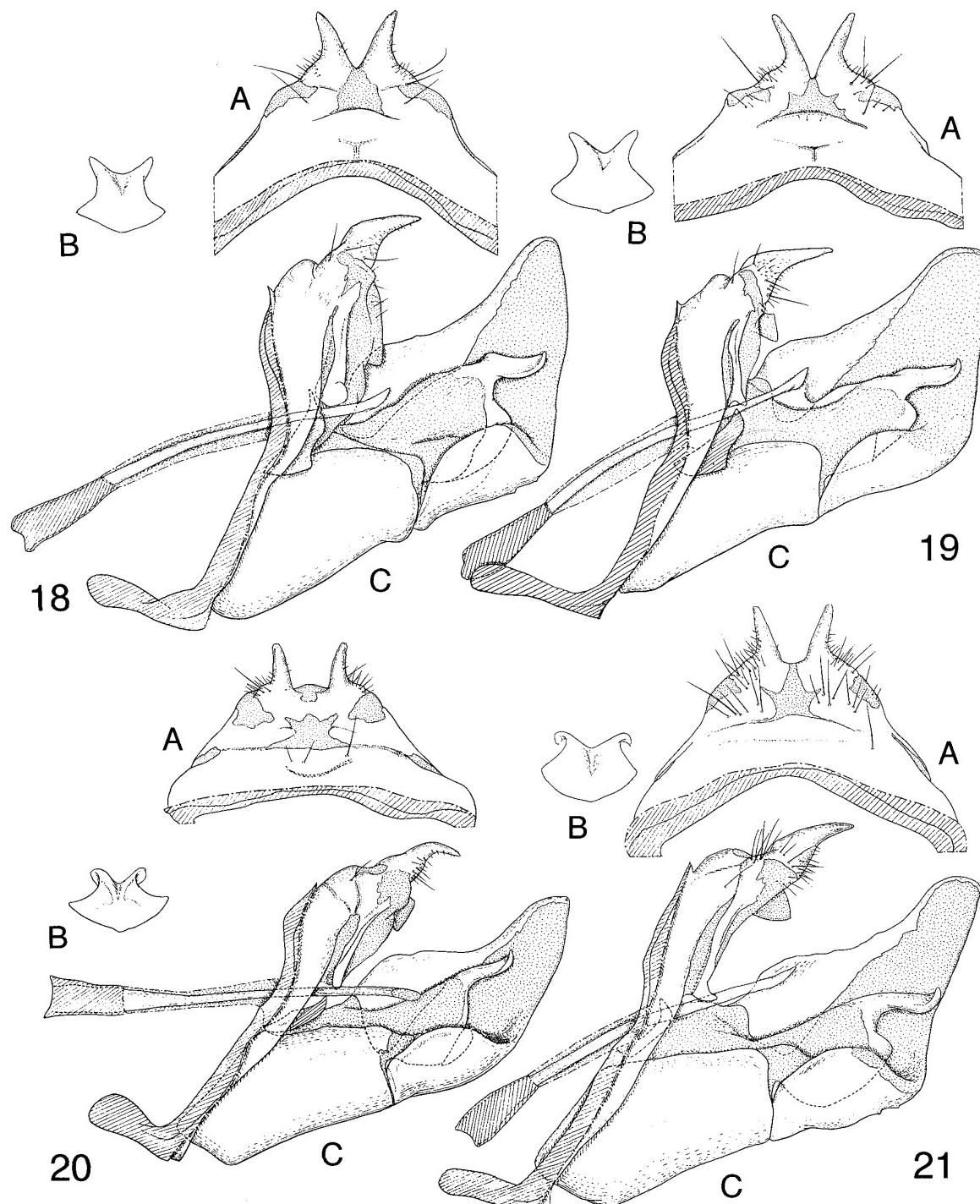
Male genitalia (Figs 18–19). Clearly distinguished from those of *P. stenosemus* Honrath, particularly in the form of dorsum, basal part of uncus being fused. Also, the form of juxta is different from each other. We show for comparison the drawings of genitalia of ssp. *harutai* nov. (Fig. 18) and ssp. *parangensis* Eisner (Fig. 19) from Parang Pass, Spiti, north-west India.

Holotype. ♂, forewing length 26 mm. Tata, alt. 4,490 m, Mahakali, western Nepal, July 2, 1995, leg. M. S. Limbu. Paratypes. 2 ♂ 2 ♀, same data as holotype. All the type specimens are tentatively preserved in Omoto's collection.

The occurrence of *P. stoliczkanus* Felder & Felder in Nepal was first recorded by Ohya (1996) as *P. stoliczkanus nobuko* Ohya based on the specimens collected by Mr Limbu mentioned above. However, since ssp. *nobuko* he described should belong to *P. stenosemus* Honrath as shown below, our present report together with the list made by Inomata (1998) gives the first true evidence for the occurrence of *P. stoliczkanus* and its sympatry with *P. stenosemus* in Nepal. According to the map made by Mr Limbu for Mr Haruta, the place called Tata (4,490 m) is located below Tinkar Pass (5,258 m), bordering Nepal and Tibet, in the northern Darchura area of Mahakali District, the westernmost part of Nepal (K. Morishita, *pers. comm.*) (Fig. 22). This new subspecies is dedicated to and named after the late Mr Toshiro Haruta.

We were unable to examine *P. nandadevinensis* D. Weiss, which was described on a single male specimen taken in Mt Nanda Davi, north eastern Uttar Pradesh, India, located about 100 km to the west of Tata (Fig. 22). J. C. Weiss (1992), who illustrated this interesting taxon, considers it to be closely related to *P. acdestis* Grum-Grshimailo. Judging from the wing form and markings, however, we feel that this taxon may belong either to *P. stoliczkanus* or *P. stenosemus*.

*Judging from the photograph of the type specimen (Fig. 7), we suspect that this taxon belongs to *P. stenosemus* Honrath, rather than *P. stoliczkanus* Felder & Felder.



Figs 18-21. Male genitalia of *Parnassius stoliczkanus* spp. and *P. stenosemus* spp. 18. *P. stoliczkanus harutai* ssp. nov. 19. *P. stoliczkanus parangensis* Eisner. 20. *P. stenosemus nobuko* Ohya. 21. *P. stenosemus mulkilensis* Inaoka & Ogawa. (A: Dorsal view of dorsum. B: Caudal view of juxta. C: Lateral view of the whole genitalia).

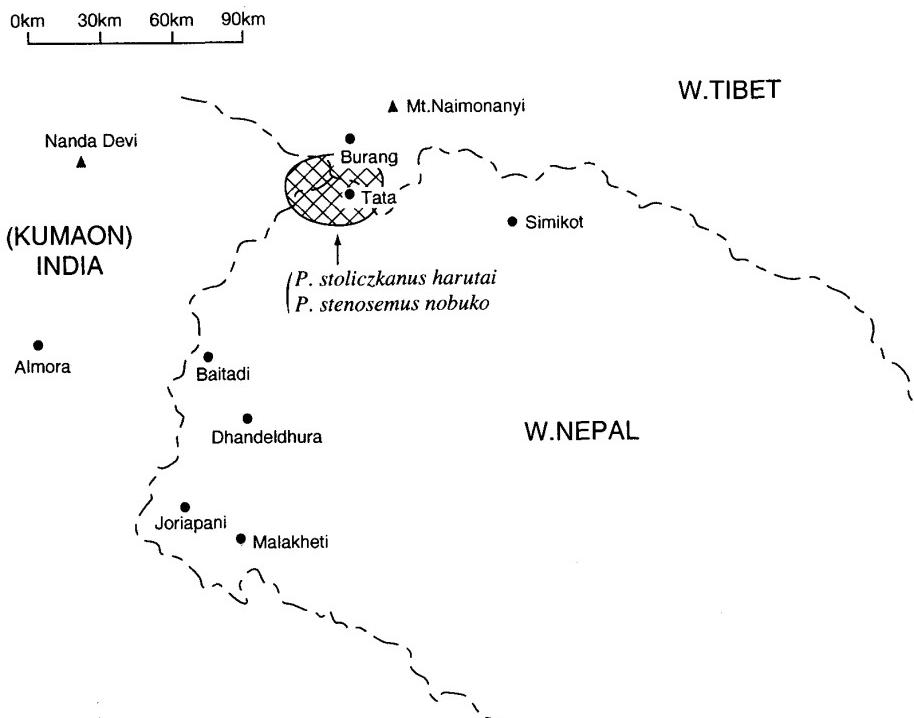


Fig. 22. A map showing the distribution of *Parnassius stoliczkanus harutai* ssp. nov. and *P. stenosemus nobuko* Ohya in western Nepal.

Parnassius stenosemus nobuko Ohya (Figs 3-4)

Parnassius stoliczkanus nobuko Ohya, 1996, *Gekkan-Mushi* (309): 8, pl. 2, figs 5-6.

Parnassius stenosemus nobuko: Inomata, 1998, *Tinea* 15 (Suppl. 1): 313, pl. 160, figs 7-9.

Clearly distinguishable from the former species in wing shape and markings, as well as in male genitalia. The most obvious difference in the wing markings between the two allied species lies in the red spot in space 7 on the hindwing. In the male genitalia (Figs 20-21), dorsum has uncus widely separated at its base while it is fused in *P. stoliczkanus*. Also the form of juxta is different from each other. We show for comparison the drawings of genitalia of ssp. *nobuko* (Fig. 20) and ssp. *mulkilensis* Inaoka & Ogawa (Fig. 21) from Bara-Lacha Pass, Lahul, north-west India.

A large number of this taxon was collected along with a small series of *P. stoliczkanus harutai* ssp. nov. in Limbu's trip to Tata during July 2-7, 1995. According to his own diary and map, the altitude of Tata is 4,490 m, and not 4,800 m given in the description of ssp. *nobuko* by Ohya (1996).

P. stenosemus and *P. stoliczkanus* are both distributed in the western part of the Great Himalayas, and in most places they seem to be sympatric, although it is open for future study whether they actually share the same biotope or ecological niche including the foodplant.

Parnassius simo kanoi subsp. nov. (Figs 9-11)

Size: Larger (length of forewing 18-19 mm) than ssp. *hingstoni* Bryk (Fig. 12), but smaller than ssp. *acconus* Fruhstorfer (Fig. 8). It is about the same size as ssp. *shishapangmanus*

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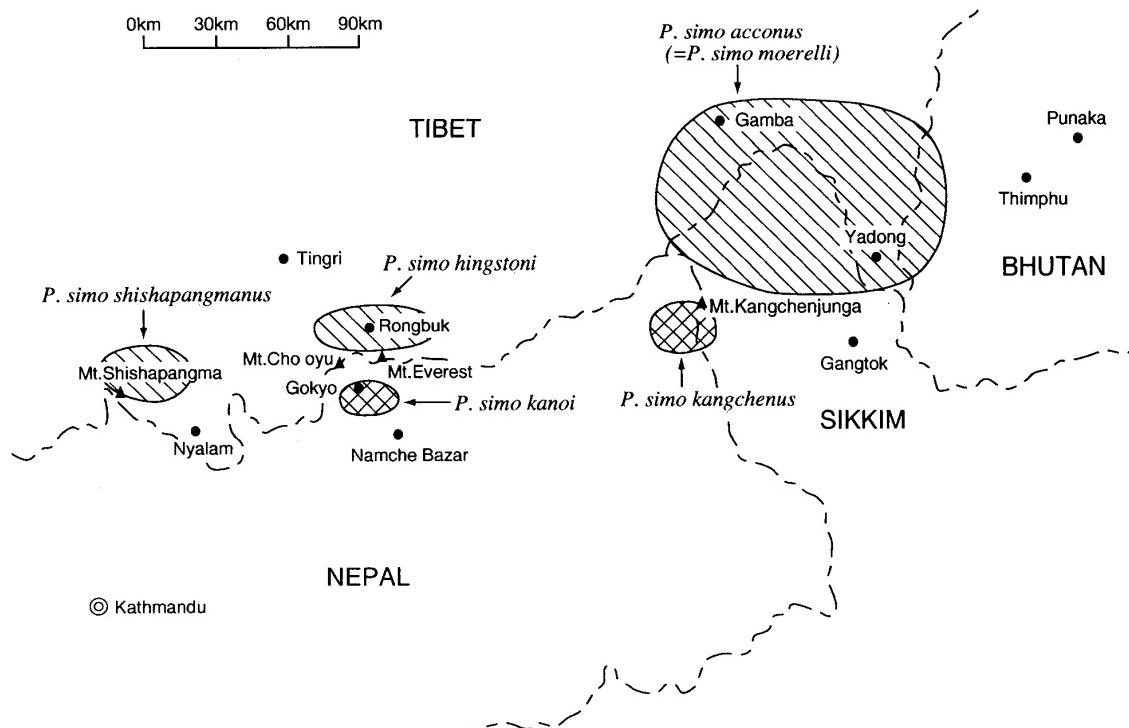


Fig. 23. A map showing the distribution of subspecies of *Parnassius simo* Gray in Nepal and southern Tibet.

Kawasaki (Figs 13). Forewing: (1) Marginal black band is narrow, while submarginal black band is strongly developed. This character is in common with ssp. *hingstoni* and ssp. *shishapangmanus* recently described by Kawasaki (1997), occurring in the north of Mt Everest (Chomolungma) and Mt Shishapangma in southern Tibet, respectively, but not found in other subspecies. (2) Similar to ssp. *acconus* in that the postdiscal black band through spaces 5, 6 and 7 is well developed. This band is less developed in ssp. *hingstoni* and ssp. *shishapangmanus*. (3) Apex is pointed and ground colour is whitish, with black fringes, while in ssp. *shishapangmanus* the fringes are black-and-white in most specimens. Hindwing: (1) Red spots in spaces 5 and 7 are small, not well developed. (2) Marginal black band is reduced, while submarginal black spots are well developed. (3) Basal black scales are rich, suggesting the effect of monsoon climatic factors.

Holotype. ♂, forewing length 18 mm, Gokyo Peak, alt. 5,000–5,300 m, north of Namche Bazar, Khumbu, north-east Nepal, June 6, 1973, leg. Katsuhiko Kano (in coll. Omoto). Paratypes. 2 ♂, same data as holotype (in coll. Omoto); 18 ♂ 8 ♀, Gokyo, Khumbu, north-east Nepal, July 23–Aug. 7, 1985, leg. Katsuhiko Hori (in coll. Omoto, Kawasaki, Hori and Sugiyama).

Named after Professor Katsuhiko Kano, The University of Kanazawa, who collected this taxon for the first time in Nepal.

It is interesting that this subspecies appears to have close affinities in wing markings to ssp. *hingstoni* (Fig. 12) and ssp. *shishapangmanus* (Fig. 13), both are recorded in southern Tibet, at the northern side of the highest Himalayan ridge including Mt Everest, as mentioned above (Fig. 23).

***Parnassius simo kangchenus* subsp. nov. (Figs 15–16)**

Parnassius simo acconus : Inomata, 1998, *Tinea* 15 (Suppl. 1) : 313, pl. 160, figs 10–12 (*nec* Fruhstorfer, 1903).

Size : Larger than ssp. *kanoi* nov. described above, but slightly smaller than ssp. *acconus* Fruhstorfer. Forewing : Similar to ssp. *acconus*. Marginal black band is much more developed than in ssp. *kanoi* nov. Hindwing : The red spots in spaces 5 and 7 are reduced, while they are well developed in ssp. *acconus*. Submarginal black spots are small and reduced, while they are very well developed in ssp. *acconus*.

Holotype ♂, forewing length 21 mm, near Lhonak, alt. 4,550 m, west of Mt Kangchenjunga, Mechi District, east Nepal, July 15–20, 1996, leg. M. S. Limbu (in coll. Omoto). Paratypes. 22 ♂ 8 ♀, same data as holotype (in coll. Omoto and coll. Kawasaki).

The name *kangchenus* is derived from Mt Kangchenjunga (8,586 m), where the Nepalese ‘kangchen’ means a sacred snow mountain, and ‘junga’ five. The locality of this subspecies (4,550 m) is at the western slope of the high mountain ridge separating Nepal from Sikkim to the east and southern Tibet to the north, where ssp. *acconus* is distributed (Fig. 23).

***Parnassius acdestis horikatsuhikoi* Shinkai (Figs 5–6).**

Parnassius acdestis horikatsuhikoi Shinkai, 1997, *Wallace* 3 : 30.

We examined a single female specimen (Fig. 5) from Gokyo Peak, at altitude 5,000–5,300 m, collected together with three type specimens of *P. simo kanoi* ssp. nov. by Katsuhiko Kano on June 6, 1973. This specimen of *P. acdestis* Grum-Grshimailo has white ground colour with reduced black markings, resembling ssp. *hades* Bryk recorded from north of the Mt Everest area of southern Tibet. It is markedly different from the two dark races hitherto well known from Nepal : ssp. *marki* Epstein and ssp. *laurentii* Epstein from Mustang and the Dolpo areas of central Nepal, respectively.

Recently, Shinkai (1997) described ssp. *horikatsuhikoi* based on the specimens collected by Katsuhiko Hori at Gokyo, the same locality, and we determine our specimen as belonging to this subspecies. However, our specimen does not seem to match completely with the female type specimen (Fig. 6) illustrated by Shinkai (1997). It is also intriguing that the type specimens of ssp. *horikatsuhikoi*, both males and females, were collected in late July, while the present female was taken in early June. Future study is necessary to clarify the range of individual variation and ecology of the *P. acdestis* population of this region of northern Khumbu.

The fact that ssp. *horikatsuhikoi* is similar to ssp. *hades* from southern Tibet parallels the finding that *P. simo kanoi* ssp. nov. resembles ssp. *hingstoni* and ssp. *shishapangmanus* already mentioned. Apparently, there is a route of migration of the Tibetan fauna from the north of the high mountain ridges involving Mt Everest southward to northern Khumbu district of Nepal.

Acknowledgements

We thank Professor Katsuhiko Kano, Kanazawa, for providing us with data about two parnassine butterflies he collected in Gokyo described in this paper, as well as geography and other aspects of Nepal. We are indebted to Mr Toshio Inomata, Tokyo, for his generous

loan of valuable materials of the Haruta collection for this study. Thanks are due to Mr Katsuhiko Hori, Nagano, for providing us with the specimens and ecological data he obtained in Nepal, to Dr P. R. Ackery, The Natural History Museum, London, and to Mr Shiro Sugisawa, Shizuoka, for making available to us the photographs of type specimens. Mr Kazuhiko Morishita, Kanagawa, kindly read our manuscript and gave us valuable information about the Haruta collection and other aspects relating to butterflies of Nepal. Professor Toyohei Saigusa, Kyushu University, and Dr Kyoichiro Ueda, Kitakyushu City Natural History Museum, kindly helped us in drawing the figures of genitalia. Further, Dr Atsuo Ohya, Okayama and Mr H. Yoshimoto, Tokyo, gave us valuable suggestions. Lastly, we are grateful to Mrs Shizuko Haruta, Tokyo, for kindly giving us personal information about the late Mr Toshiro Haruta.

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摘要

春田コレクションのネパール産パルナシウス属の若干の蝶類 (尾本恵市・川崎裕一)

故春田俊郎氏と協力者の努力によって蒐集されたネパール産のパルナシウス属蝶類について、下記の通り新記載および分類学上の検討を行った。(1) ネパール最西北部のTata産の標本に基づき新亜種として *P. stoliczkanus harutai* を記載した。(2) 上記亜種と同所的に産する *P. stenosemus nobuko* Ohya の分類学上の位置を確認した。(3) 北東ネパールのクーンブ州北部のGokyo産の標本に基づき新亜種として *P. simo kanoi* を記載した。(4) 東ネパールのカンチェンジュンガ峰の西部より新亜種 *P. simo kangchenus* を記載した。(5) Gokyo産の *P. acdestis horikatsuhikoi* Shinkai をあらたに記録し、その地理的変異および分布を検討した。

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